

*South Carolina Department of Transportation*



*Electronic Toll Collection System & Related Services*

For the  
Cross Island Parkway Toll Facility  
Hilton Head, South Carolina  
Contract P.O.# 231709

# **LMC Year 2000 Compliance Process**

(Ver 2.3, 10-1-98)  
EIS-SE-YR2000-PRO1v2.30

**Rev. 0.0**

**November 1998**

**LOCKHEED MARTIN**

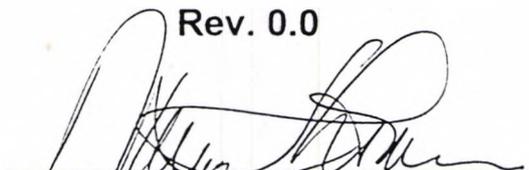


# Lockheed Martin IMS

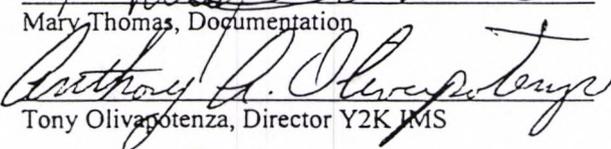
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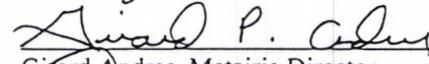
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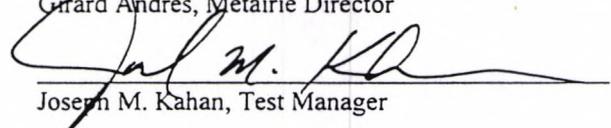
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# Introduction

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## Purpose

In order to ensure that products and development environments are in accordance to Lockheed Martin Year 2000 Compliant (Y2K) standards, this plan has been developed. This plan serves as a reference and a guide to outline activities necessary to prepare and deploy a successful roll out of Y2K. By utilizing the architecture called out within this document, a clear understanding of the extent and effort associated with the execution of a successful Y2K implementation can be obtained.

## Scope

This document defines the products, tasks, responsibilities, and planning agreements for the integration, test, and verification of products associated with the Metairie Software Development Group Y2K compliance. The work outlined in this document includes all products delivered from the Metairie Software Development Group facility as well as the Metairie development environment.

This document is directly responsible for procedures and guidelines called out in the Lockheed Martin Y2K Certification Process document EIS-SE-YR2000-PRO-1v2.20.

This document will cover the following projects:

- Metro-Dade – Dade County Metro-systems
- NY EZ-Pass –
- NYSTA – NY State Thurway Authority
- MdTA – Maryland ETC
- SC DOT – South Carolina Department of Transportation
- ATCAS – Caltrans Software Development
- DRPA – Delaware River Port Authority
- PANY NJ – NY & NJ Port Authority

- CBBT – Chesapeake
- TCA –  
⇒ MTA B&T

This document includes the following:

- Y2K Issue
- Verification Policies and Process
- Metairie Software Development Group Obligations, Roles, and Responsibilities
- Verification Implementation Activity
- Y2K Implementation Schedule

## Verification — Goals and Philosophy

The goal of this activity is to receive a certificate of compliance from the Lockheed Martin Corporation (LMC) as well as provide the Metairie Software Development Group's customers with the assurance that their facilities will operate in accordance to their original system specifications, during and after the year 2000.

Verification performed at both the Metairie Software Development Group location and at the customer sites will focus on the following major objectives, in the order provided:

1. To utilize vendor supplied Y2K certificates in conjunction with Lockheed Martin obtained Y2K reports to support the majority of the work outlined within this plan.
2. To ensure that all requirements and objectives found in the Lockheed Martin Y2K Compliance document can be verified.
3. To design test activities to be cost effective on resources such as time, support personnel and support tools.
4. To provide provisions to allow each facility to be verified within a standalone environment and with minimal impact to normal operations.
5. To design all verification activities with an overall System Level test approach. This means each test will be designed, to be executed, using standard resources available under normal operational conditions.





# 1. Documents

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## 1.1 Applicable Documents

Reference Name	Title
EIS-SE-YR2000-PRO-1v2.20	LMC Year 2000 Certification Process

## 1.2 Reference Documents

Reference Name	Title	Issue Date
IGG-020597-03 IGG Gartner Group	Year 2000: The Project Time Line	
TV-000-197 IGG Gartner Group	Practical Advice Concerning Year 2000 Projects	
TU-850-180 IGG Gartner Group	Year 2000 Hints, Tips, and Practical Advice	
InfoWorld	Microsoft Not Y2K Ready	July 6, 1998 Vol. 20, Issue 27
PC Magazine	What to do about 2000	Oct. 6, 1998
Information Week	Year 2000: Is it time to Panic?	March 23, 1998
Computer World	Y2K: Wartime Mentality	June 1, 1998



## 2. Y2K Issue

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The Y2K issue is based on the fact that a lot of computer applications have stored date fields in a two-digit format, instead of a four-digit format. The result of dates being stored in a two-digit format is that only the last two numbers of a year, such as 1998 is save as "98", are stored when data is saved. The problem with this architecture is that when a year beyond 2000 is used and compared with the short two-digit date, the total result could be the year 2098 instead of 1998. The plan behind the Y2K project is understand and, in most cases, correct the results before entering the ambiguous years of beyond 2000.

To understand the issue at the computer application level, LMC must first understand the hardware and firmware associated with that application. Each system design is different and the results may vary when combining hardware, firmware, and software architectures in a single system or subsystem design.

The commitment of LMC is to understand all LMC systems, components, electronic devices, applications, internal and external system interfaces, and related future purchase products which may or may not be compliant with the Y2K issue.



# 3. Verification Policies and Process

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## 3.1 Verification Roles and Responsibilities

Both the Metairie Software Development Group and its customer(s) are responsible for providing resources necessary to support verification at each level of the process. Resources will include and not be limited to facility equipment, personnel, and schedules.

### 3.1.1 Metairie Software Development Group

The Metairie Software Development Group is responsible for design, development, and testing of the resources provided within the Metairie Software Development Group's office and the customer locations. The Metairie Software Development Group will provide resources to support the following:

1. Coordination of documentation and verification activities in support of the goals provided in Section 1.3
2. Verification of all activities related to Y2K objectives
3. Verification and Documentation to support test activities at the Metairie Software Development Group and customer sites
4. Selection and execution of all Y2K objectives
5. Providing results of the process outlined in this plan
6. If applicable under current contracts, for providing solutions for all functions found to be non-compliant of Y2K objectives

### 3.1.2 Customer(s)

1. Participate in execution planning of the verification activities related to supporting the goals provided in Section 1.3
2. Provide facility resources in support of Y2K objectives
3. Select the test method used for final execution of the Y2K objectives. Analysis will be the selected method if customer(s) cannot support activities and schedules outlined in this plan. Demonstration will be the selected method if customer(s) can support activities and schedules outlined in this plan.

## 3.2 Verification Methods

Verification methods provide a technique for understanding and agreement upon a methodology for verification of requirements. By reviewing each requirement against these methods, a conclusion can be reached for proper selection of the resources required to satisfy the closure of the requirement.

### 3.2.1 Analysis

Analysis is a process used in lieu of, or in addition to, other methods to ensure compliance of specification requirements. The selected techniques may include, but are not limited to, engineering analysis, statistical and qualitative results from other similar tests, computer and hardware simulations, and analog modeling. Analysis may be used when it can be determined that:

1. Accurate conclusions can be derived
2. Testing is not cost effective
3. Inspection or demonstration is not adequate or cannot be performed

### 3.2.2 Inspection

Inspection is a method that determines conformance to requirements by the review of drawing, data, or by visual examination of the item using standard quality control methods.

### 3.2.3 Test

Test is a method in which technical means — such as the use of special equipment, instrumentation, simulation techniques, and the application of established principles and procedures — are used for the evaluation of components, subsystems, and systems to determine compliance with requirements. In most cases, special equipment is used to induce signals into the article under evaluation in order to observe quantitative results.

### 3.2.4 Demonstration

Demonstration is a method which primarily uses observation to determine if a requirement has been satisfied. The function is demonstrated by simulating and observing the components, subsystems, and systems with minimal special equipment. The criteria for evaluation is either pass or fail.

### 3.3 Problem Reporting and Correction Action

Waivers and / or deviation requests will be presented to the Metairie Software Development Group's Engineering Review Board (ERB) for disposition and, with approval from the review board, presented to the Metairie Software Development Group's Operations Director for approval. Results of waivers or deviations will be provided within the final test reports.

If corrective actions must be performed, an action plan will be provided within 60 days after completing Y2K report generation. The action plan will provide negotiated schedules and activities associated with making the facility Y2K compliant within 60 days following the initiation of the corrective action plan.

In order to ensure future Y2K compliance, all purchases of hardware, firmware, and software as of October 1, 1998 will require a Y2K certificate of compliance from the vendor.

**4. VERIFICATION  
IMPLEMENTATION**

# 4. Verification Implementation Activity

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This section outlines the activities associated with implementing this plan. Activities will be carefully outlined in sequence to ensure a successful execution of the provisions outlined within this plan.

## 4.1 Preliminary Data

The first phase involves the gathering and analysis of all items purchased from the Metairie Software Development Group in support of customer deliveries and for in office development. A list of these items will be constructed on spreadsheets and audited for Y2K compliance. Compliance or non-compliance conclusions will be based on Metairie Software Development Group obtained vendor supplied Y2K reports and / or Lockheed Martin corporate obtained compliance reports. This data will be organized to help understand what resources need to have further testing in order to satisfy compliance requirements outlined within this plan.

During this time period, the Metairie Software Development Group and customer site databases will be evaluated for Y2K compliance. The databases will be reviewed against the platforms that created them. These databases, such as recorded user account data, will be reviewed, but will not modified to be compliant. Non-compliant databases will be addressed in each of the Compliance Report(s) and warnings will be provided for resulting consequences.

Interfaces, such as Credit card vendors, are also reviewed during this time because of their direct influence on the databases and overall system design. All credit card vendors will be asked to provide a certificate of Y2K compliance. Interfaces that provide data to outside sources will not be reviewed due to their lack of influence on the system or databases.

For those items that may be questionable in satisfying Y2K compliance, a test objective and test scripts will be generated.

## 4.2 Metairie Software Development Group and Customer Site Testing

The Metairie Software Development Group and customer sites will be investigated for Y2K compliance. As a result of the preliminary data analysis, further testing may be required. This section presents the environment and known procedures for which actual testing will be required.

### 4.2.1 Metairie Development Environment

Metairie Development Environment testing is the key to understanding each of the customers' ability to be Y2K compliant. This testing should be complete prior to beginning any customer site testing. This testing will review common hardware platforms and software applications used to develop, as well as test, development tools.

Known tests that will be investigated:

1. Y2K roll over from 11:55 12/31/1999 to 00:05 1/1/2000
2. Leap year 2000
3. Decade 2030 roll over

Because the result of the Metairie Software Development Group testing directly influences customer site testing, reports generated during testing will be used as the basis for testing at each customer site. Due to the fact that the customer(s) can neither impact nor influence these tests, copies of these reports or details from the tests will not be distributed outside LMC.

### 4.2.2 Customer Site Testing

Customer Site testing will be the final examination of a successful Y2K investigation. This testing will be reviewed for minimal impacts to the customer while at the same time gather sufficient data to complete all major test objects.

As stated in Section 4.1.3 Customer(s), testing activities will be reviewed with the customer. Schedules and test durations will be discussed, and the final decision on whether or not testing will be executed, will be the determination of the customer.

Known tests that will be investigated:

1. Y2K roll over from 11:55 12/31/1999 to 00:05 1/1/2000
2. Leap year 2000
3. Decade 2030 roll over

It should be known that each of these tests is intrusive to normal operations. Client / Server clocks will need to be reset resulting in skewed time-stamps within the live databases.

## 4.3 Test and Compliance Reports

After completion of the Metairie Software Development Group and customer site testing, test reports will be generated to document Y2K compliance results. Each report will provide a review of the steps executed in the evaluation process. These reports will address conclusions made during the process as well as areas, which were found to be non-compliant. A total list of hardware, software, and if applicable, facility database(s) will be reported. Test reports will be generated and issued to each facility before January 1, 1999.

In order to provide a clear understanding of the results, a meeting may be established with the System Test manager following the release of the Test Report(s). A complete list of questions for discussion will be provided at least two weeks prior to the meeting. If further actions are required, activities will be evaluated to determine cost and schedule impacts.

## 4.4 Test Personnel

Both the Metairie Software Development Group and its customers are responsible for providing certain test personnel in support of Y2K testing. Each position plays an important role and responsibility in controlling as well as satisfying the objectives outlined for a given test activity.

### 4.4.1 Test Director

The Test Director is responsible for the overall execution and completion of a given test activity. The Test Director is responsible for planning and execution of the overall test activity as well as reporting results back to the Metairie Software Development Group. This individual has overall control authority over the facility objectives and is supported by a customer supplied facility manager. This individual is also directly responsible for executing the intent of this plan, documenting the results of the test, and for the priorities made during the execution of the test. In all cases, the Test Director will be provided by the Metairie Software Development Group's System Test organization.

### 4.4.2 Facility Manager

The Facility Manager is responsible for coordinating resources and schedule required to complete all objectives outlined in the facility test procedures. This individual will work with the Test Director prior to and during the execution test in order to ensure the success of the test. The Facility Manager will also be responsible for providing a test report to the Test Director following the execution of the test. This report will provide a complete list of any anomalies found during the test and the absence of any resource required to complete the test. This report will be provided within 48 hours following the completion of the test.

### 4.4.3 Test Support Personnel

Test support personnel will need to be provided by both the Metairie Software Development Group and the Facility Manager to order to complete the execution of the test objectives. These persons will either report to the Facility Manager and/or the Test Director. Each test support person will be responsible for executing and reporting results for a predetermined number of test objectives.

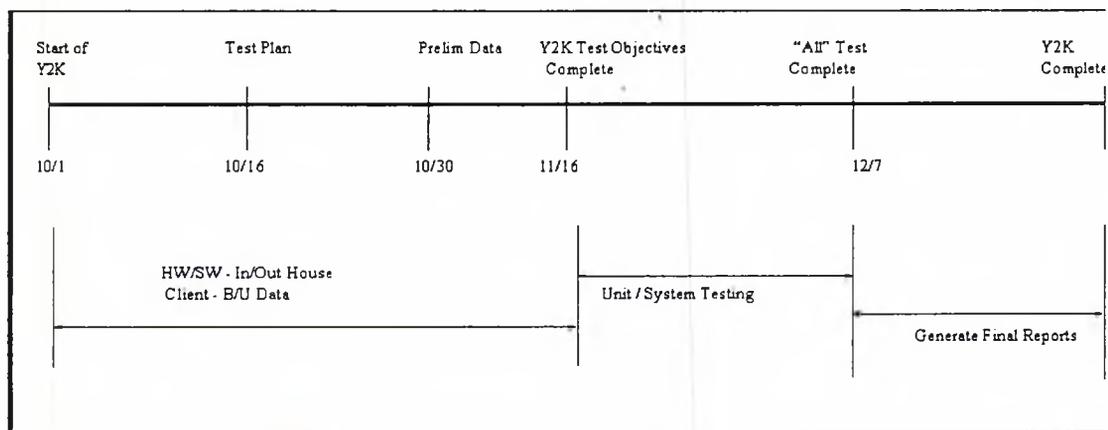
## 4.5 Test Procedures / Scripts

Test Procedures provide the control of a selected portion of this plan. The Metairie Software Development Group will be responsible for the development, coordination, and execution of these documents. These procedures will describe the test objectives, resources, personnel, and the time necessary for a given verification or validation activity.

In order to ensure proper control and execution, the Test Manager will be responsible for coordinating all procedures related to the sequencing and execution of test objectives.

**5. Y2K IMPLEMENTATION  
SCHEDULE**

## 5. Y2K Implementation Schedule



To understand the overall activities related to verifying the Y2K objectives called out in this plan, the above schedule has been provided. This schedule only reflects the overall time frame for activities related to completing this plan.

There are several major milestones in the process to complete Y2K compliance. Each of the above milestones and activities can be related to various sections within this plan. Below is a list of those relationships:

1. Preliminary Data – Preliminary Data [5.1]
2. HW / SW Review – Preliminary Data [5.1]
3. Y2K Test Objectives – Metairie Software Development Group and Customer Site Testing [5.2]
4. Unit / System Testing – Metairie Software Development Group and Customer Site Testing [5.2]
5. Generate Final Reports – Test and Compliance Reports [5.3]